

PATENT COOPERATION TREATY

PCT

REC'D 10 OCT 2005

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY (Chapter II of the Patent Cooperation Treaty)

WIPO PCT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference PE18448PC00	FOR FURTHER ACTION See Form PCT/IPEA/416																									
International application No. PCT/SE2004/000950	International filing date (day/month/year) 15-06-2004	Priority date (day/month/year) 18-06-2003																								
International Patent Classification (IPC) or national classification and IPC H04L29/06, H04L12/56, H04L12/28																										
Applicant Telefonaktiebolaget LM Ericsson (publ) et al																										
<ol style="list-style-type: none"> 1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36. 2. This REPORT consists of a total of <u>3</u> sheets, including this cover sheet. 3. This report is also accompanied by ANNEXES, comprising: <ol style="list-style-type: none"> a. <input checked="" type="checkbox"/> (sent to the applicant and to the International Bureau) a total of <u>7</u> sheets, as follows: <div style="margin-left: 20px;"> <input type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions). <input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box. </div> b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions). 4. This report contains indications relating to the following items: <table style="width: 100%; border: none;"> <tr> <td style="width: 5%;"><input checked="" type="checkbox"/></td> <td style="width: 25%;">Box No. I</td> <td>Basis of the report</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. II</td> <td>Priority</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. III</td> <td>Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. IV</td> <td>Lack of unity of invention</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td>Box No. V</td> <td>Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VI</td> <td>Certain documents cited</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VII</td> <td>Certain defects in the international application</td> </tr> <tr> <td><input type="checkbox"/></td> <td>Box No. VIII</td> <td>Certain observations on the international application</td> </tr> </table> 			<input checked="" type="checkbox"/>	Box No. I	Basis of the report	<input type="checkbox"/>	Box No. II	Priority	<input type="checkbox"/>	Box No. III	Non-establishment of opinion with regard to novelty, inventive step and industrial applicability	<input type="checkbox"/>	Box No. IV	Lack of unity of invention	<input checked="" type="checkbox"/>	Box No. V	Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement	<input type="checkbox"/>	Box No. VI	Certain documents cited	<input type="checkbox"/>	Box No. VII	Certain defects in the international application	<input type="checkbox"/>	Box No. VIII	Certain observations on the international application
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Date of submission of the demand 17-01-2005	Date of completion of this report 04-10-2005																									
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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/000950

Box No. I Basis of the report

1. With regard to the language, this report is based on:



the international application in the language in which it was filed



a translation of the international application into _____,
which is the language of a translation furnished for the purposes of:



international search (Rules 12.3(a) and 23.1(b))



publication of the international application (Rule 12.4(a))



international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the elements of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*:



the international application as originally filed/furnished



the description:

pages 1 - 43

as originally filed/furnished

pages*

received by this Authority on _____

pages*

received by this Authority on _____



the claims:

pages _____

as originally filed/furnished

pages*

as amended (together with any statement) under Article 19

pages* 1 - 7

received by this Authority on 28.09.2005

pages*

received by this Authority on _____



the drawings:

pages 1 - 14

as originally filed/furnished

pages*

received by this Authority on _____

pages*

received by this Authority on _____



a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

3. ☐ The amendments have resulted in the cancellation of:



the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____



the sequence listing (*specify*): _____



any table(s) related to the sequence listing (*specify*): _____

4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).



the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____



the sequence listing (*specify*): _____



any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2004/000950

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Claims	<u>1-53</u>	YES
	Claims	<u>---</u>	NO
Inventive step (IS)	Claims	<u>1-53</u>	YES
	Claims	<u>---</u>	NO
Industrial applicability (IA)	Claims	<u>1-53</u>	YES
	Claims	<u>---</u>	NO

2. Citations and explanations (Rule 70.7)

Documents cited in the International Search Report:

D1. "TIA/IS-835-B, CDMA2000 WIRELESS IP NETWORK STANDARD" TIA/EIA INTERIM STANDARD, XX, XX, SEPTEMBER 2002 (2002-09), pages 1-111, XP002288685.

D2. FACCIN S., LE F., PATIL B., PERKINS C.E.: "Diameter Mobile IPv6 Application draft-le-aaa-diameter-mobileipv6-03.txt" AAA WG INTERNET-DRAFT, 1 April 2003 (2003-04-01), XP015004098 IETF.

D3. AGASHE P., QUICK F.: "EAP over CDMA2000 (EAPoCDMA2000), draft-pagashe-eapcdma2000-00.txt" INTERNET DRAFT, 1 December 2002 (2002-12-019, XP015004741 IETF.

D4. OHBA Y., DAS S., PATIL B., SOLIMAN H., YEGIN A.: "Problem Statement and Usage Scenarios for PANA draft-ietf-pana-usage-scenarios-05.txt" INTERNET DRAFT, 8 April 2003 (2003-04-08), XP015002967 IETF.

The cited documents represent the general state of the art. The invention defined in claims 1-53 is not disclosed by any of these documents. The cited prior art does not give any indication that would lead a person skilled in the art to the claimed method of authentication and authorization. Therefore, the claimed invention is not obvious to a person skilled in the art. Accordingly, the invention defined in claims 1-53 is novel and is considered to involve an inventive step. The invention is industrially applicable.

AMENDED CLAIMS

1. A method of authentication and authorization support for Mobile IP version 6 (MIPv6) in a CDMA system, characterized by transferring, between a mobile node
5 (10) in a visited network and a home network of the mobile node, MIPv6-related authentication and authorization information in an authentication protocol in an end-to-end procedure transparent to the visited network over an AAA infrastructure.
2. The method of claim 1, wherein the authentication protocol is an extended
10 authentication protocol.
3. The method of claim 1, wherein the end-to-end procedure is executed between the mobile node (10) and an AAA server (34) in the home network, and nodes in the visited network act as mere pass-through agents in the end-to-end procedure.
15
4. The method of claim 3, wherein the MIPv6-related information is transferred in the authentication protocol between the mobile node (10) and the AAA home network server (34) via an internetworking access server (22) located in the visited network.
- 20 5. The method of claim 4, wherein the internetworking access server (22) is a PDSN node
6. The method of claim 4, wherein point-to-point communication between the mobile node (10) and the internetworking access server (22) is configured based on the CSD-
25 PPP protocol.
7. The method of claim 1, wherein the MIPv6-related information also comprises MIPv6 configuration information.
- 30 8. The method of claim 2, wherein the extended authentication protocol is an extended Extensible Authentication Protocol (EAP) and the MIPv6-related

authentication and authorization information is incorporated as additional data in the EAP protocol stack.

9. The method of claim 8, wherein the MIPv6-related information is transferred as
5 EAP attributes of the method layer in the EAP protocol stack.

10. The method of claim 8, wherein the MIPv6-related information is transferred in a generic container attribute available for any EAP method.

10 11. The method of claim 8, wherein the MIPv6-related information is transferred in a method-specific generic container attribute of the method layer in the EAP protocol stack.

12. The method of claim 1, wherein the authentication protocol is carried by a protocol
15 selected from the group of PANA, PPP, and CSD-PPP between the mobile node (10) and an internetworking access server of the visited network.

13. The method of claim 4, wherein the authentication protocol is carried by an AAA framework protocol application between the internetworking access server (22) of the
20 visited network and the AAA server (34) in the home network.

14. The method of claim 13, wherein the AAA framework protocol application is selected from the group of Diameter, and RADIUS.

25 15. The method of claim 1, wherein said method further comprises the step of performing, for the purpose of MIPv6 hand-in, CHAP authentication between the mobile node and the home network.

16. The method of claim 15, wherein said step of performing CHAP authentication
30 comprises the step of using an authentication phase of PPP.

17. The method of claim 1, wherein the MIPv6-related information is transferred over the AAA infrastructure for allocation of a home agent (36).

18. The method of claim 1, wherein the MIPv6-related information is transferred over the AAA infrastructure for establishing a MIPv6 security association between the mobile node (10) and a home agent (36).

19. The method of claim 1, wherein the MIPv6-related information is transferred over the AAA infrastructure for establishing a binding for the mobile node (10) in a home agent (36).

20. The method of claim 4, wherein the internetworking access server (22) offers the mobile node the possibility to use PPP or CSD-PPP by sending out a standard PPP/LCP packet and at least a PPP/EAP packet.

21. The method of claim 20, wherein the mobile node opts for CSD-PPP using PPP/EAP, concurrently processing PPP/LCP.

22. The method of claim 20, wherein the mobile node opts for PPP and processes PPP/LCP.

23. The method of claim 20, wherein the internetworking access server also sends out a PPP/CHAP packet together with the PPP/LCP and PPP/EAP packets.

24. The method of claim 23, wherein the mobile node wants MIPv6 hand-in and opts for CSD-PPP using PPP/CHAP, concurrently processing PPP/LCP.

25. The method of claim 1, wherein assignment of a global IPv6 address is performed based on DHCP exchanges between the mobile node and the home network over the AAA infrastructure.

26. The method of claim 1, wherein IPv6 address configuration is performed based on the NCP (IPv6CP) phase of PPP for Interface-ID assignment, and IPv6 router solicitation/advertisement for obtaining the global prefix of the IPv6 address.

27. A system for authentication and authorization support for Mobile IP version 6 (MIPv6) in a CDMA system, characterized by means for transferring, between a mobile node (10) in a visited network and a home network of the mobile node, MIPv6-related authentication and authorization information in an authentication protocol in an end-to-end procedure transparent to the visited network over an AAA infrastructure.

28. The system of claim 27, wherein the authentication protocol is an extended authentication protocol.

29. The system of claim 27, wherein the end-to-end procedure is between the mobile node (10) and an AAA server (34) in the home network, and nodes in the visited network act as mere pass-through agents in the end-to-end procedure.

30. The system of claim 29, wherein the MIPv6-related information is transferred in the authentication protocol between the mobile node (10) and the AAA home network server (34) via an internetworking access server (22) located in the visited network.

31. The method of claim 30, wherein the internetworking access server (22) is a PDSN node

32. The system of claim 30, further comprising means for configuring point-to-point communication between the mobile node (10) and the internetworking access server (22) based on the CSD-PPP protocol.

33. The system of claim 27, wherein the MIPv6-related information also comprises MIPv6 configuration information.

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34. The system of claim 28, wherein the extended authentication protocol is an extended Extensible Authentication Protocol (EAP) and the MIPv6-related authentication and authorization information is incorporated as additional data in the EAP protocol stack.

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35. The system of claim 34, wherein said means for transferring MIPv6-related information comprises means for transferring the MIPv6-related information as EAP attributes of the method layer in the EAP protocol stack.

10 36. The system of claim 34, wherein said means for transferring MIPv6-related information comprises means for transferring the MIPv6-related information in a generic container attribute available for any EAP method.

15 37. The system of claim 34, wherein said means for transferring MIPv6-related information comprises means for transferring the MIPv6-related information in a method-specific generic container attribute of the method layer in the EAP protocol stack.

20 38. The system of claim 27, wherein the authentication protocol is carried by a protocol selected from the group of PANA, PPP, and CSD-PPP between the mobile node (10) and an internetworking access server of the visited network.

25 39. The system of claim 30, wherein the authentication protocol is carried by an AAA framework protocol application between the internetworking access server of the visited network and the AAA server (34) in the home network.

40. The system of claim 39, wherein the AAA framework protocol application is selected from the group of Diameter, and RADIUS.

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41. The system of claim 27, wherein said system further comprises means for performing, for the purpose of MIPv6 hand-in, CHAP authentication between the mobile node and the home network.

42. The system of claim 41, wherein said means for performing CHAP authentication is operable for using an authentication phase of PPP.

43. The system of claim 27, wherein said means for transferring MIPv6-related information is operable for transferring the MIPv6-related information over the AAA infrastructure for allocation of a home agent (36).

44. The system of claim 27, wherein said means for transferring MIPv6-related information is operable for transferring the MIPv6-related information over the AAA infrastructure for establishing a MIPv6 security association between the mobile node (10) and a home agent (36).

45. The system of claim 27, wherein said means for transferring MIPv6-related information is operable for transferring the MIPv6-related information over the AAA infrastructure for establishing a binding for the mobile node (10) in a home agent (36).

46. The system of claim 30, wherein the internetworking access server (22) is operable for offering the mobile node the possibility to use PPP or CSD-PPP by sending out a standard PPP/LCP packet and at least a PPP/EAP packet.

47. The system of claim 46, wherein the mobile node is operable for selecting CSD-PPP using PPP/EAP, concurrently processing PPP/LCP.

48. The system of claim 46, wherein the mobile node is operable for selecting PPP and processing PPP/LCP.

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49. The system of claim 46, wherein the internetworking access server is operable for sending out a PPP/CHAP packet together with the PPP/LCP and PPP/EAP packets.

50. The system of claim 49, wherein the mobile node, wanting MIPv6 hand-in, is operable for selecting CSD-PPP using PPP/CHAP, concurrently processing PPP/LCP.

51. The system of claim 27, further comprising means for assignment of a global IPv6 address based on DHCP exchanges between the mobile node and the home network over the AAA infrastructure.

52. The system of claim 27, further comprising means for IP address configuration based on the NCP (IPv6CP) phase of PPP for Interface-ID assignment, and IPv6 router solicitation/advertisement for obtaining the global prefix of the IPv6 address.

53. A system for Mobile IP version 6 (MIPv6) hand-in within a CDMA framework, characterized by means for performing CHAP authentication between a mobile node (10) in a visited network and an AAA server in a home network of the mobile node over an AAA infrastructure.
